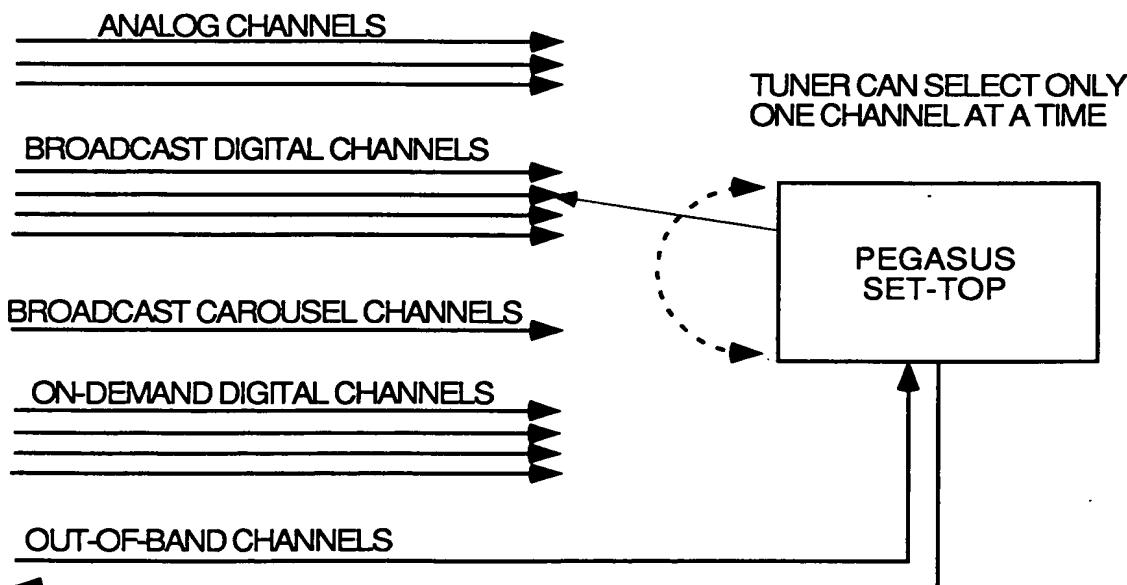


PRIOR ART
TIME WARNER FULL SERVICE NETWORK
PROTOCOL STACK

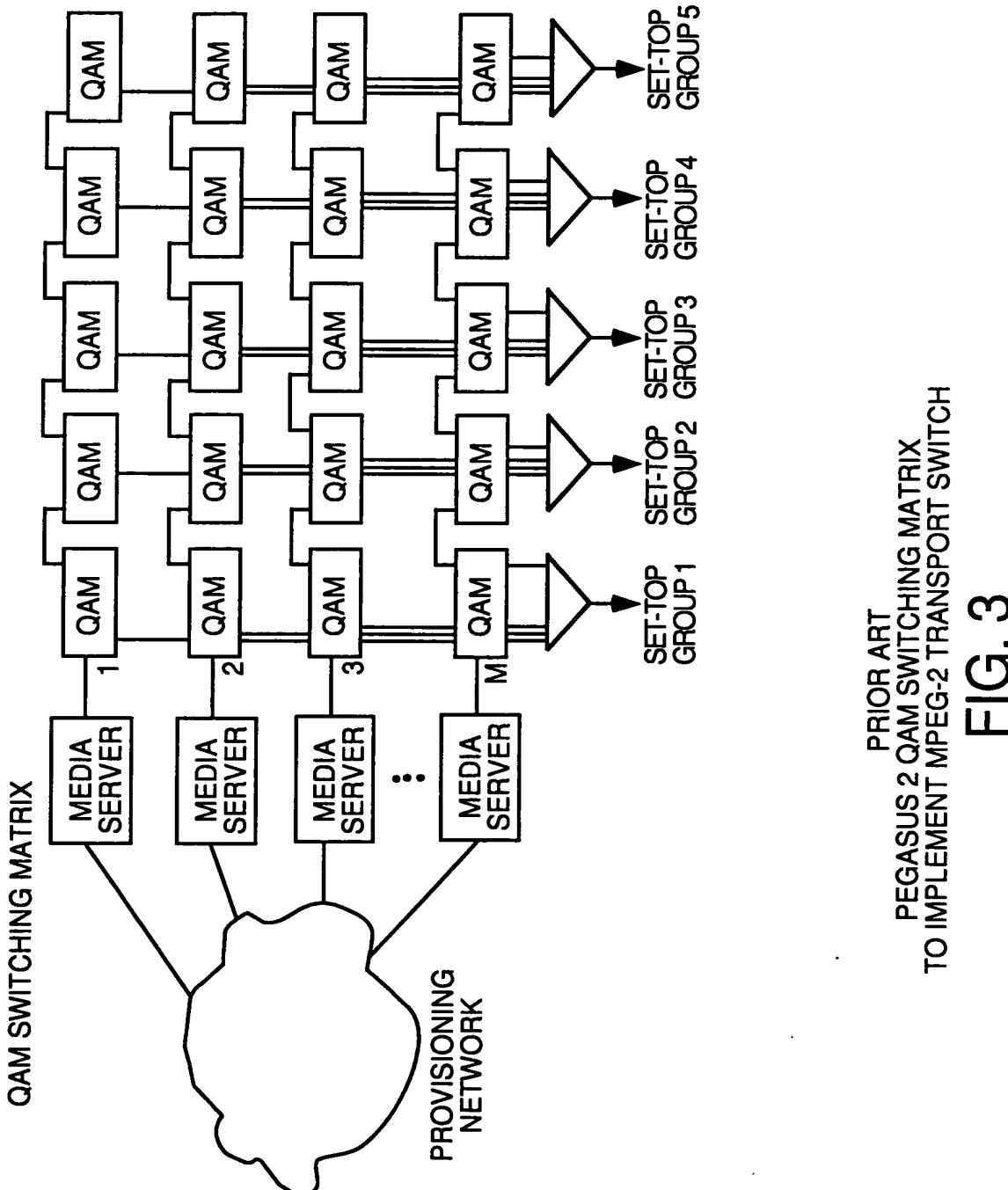
FIG. 1

PEGASUS CHANNEL TYPES

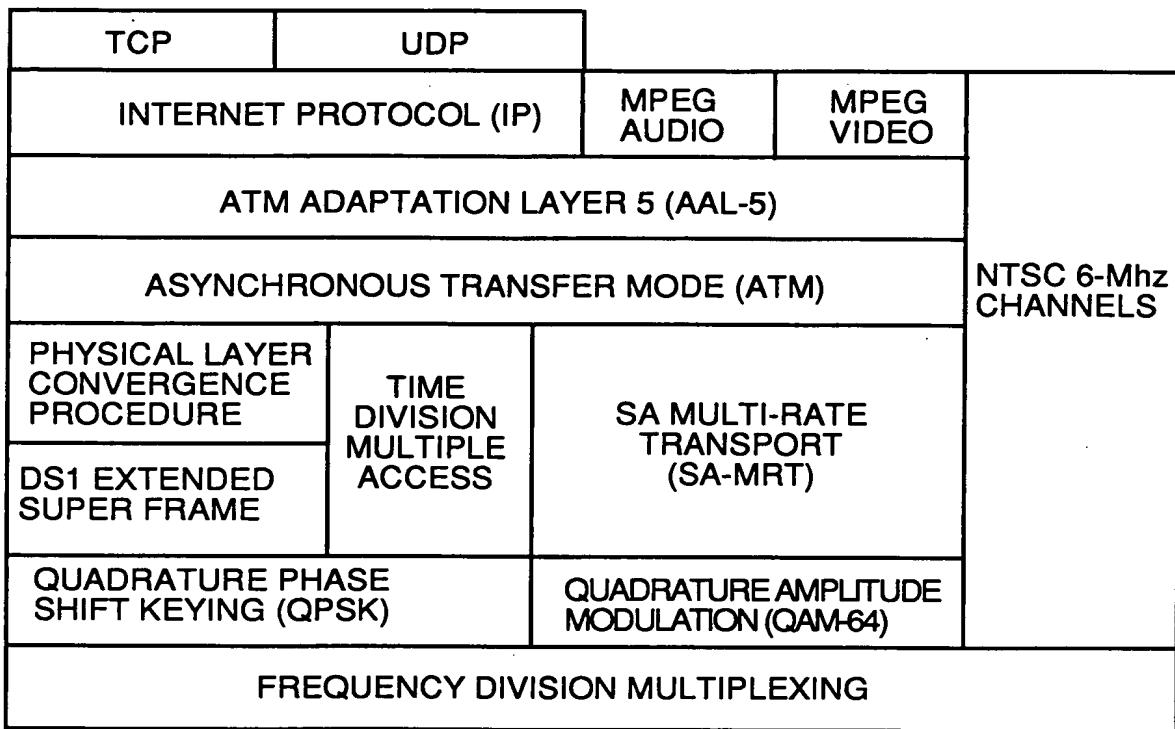


PRIOR ART
PEGASUS 2 CHANNEL TYPES

FIG. 2



COMMUNICATIONS STACK



PRIOR ART

FSN COMMUNICATION PROTOCOL STACK
MPEG DELIVERED OVER ATM SWITCHED NETWORK

FIG. 4

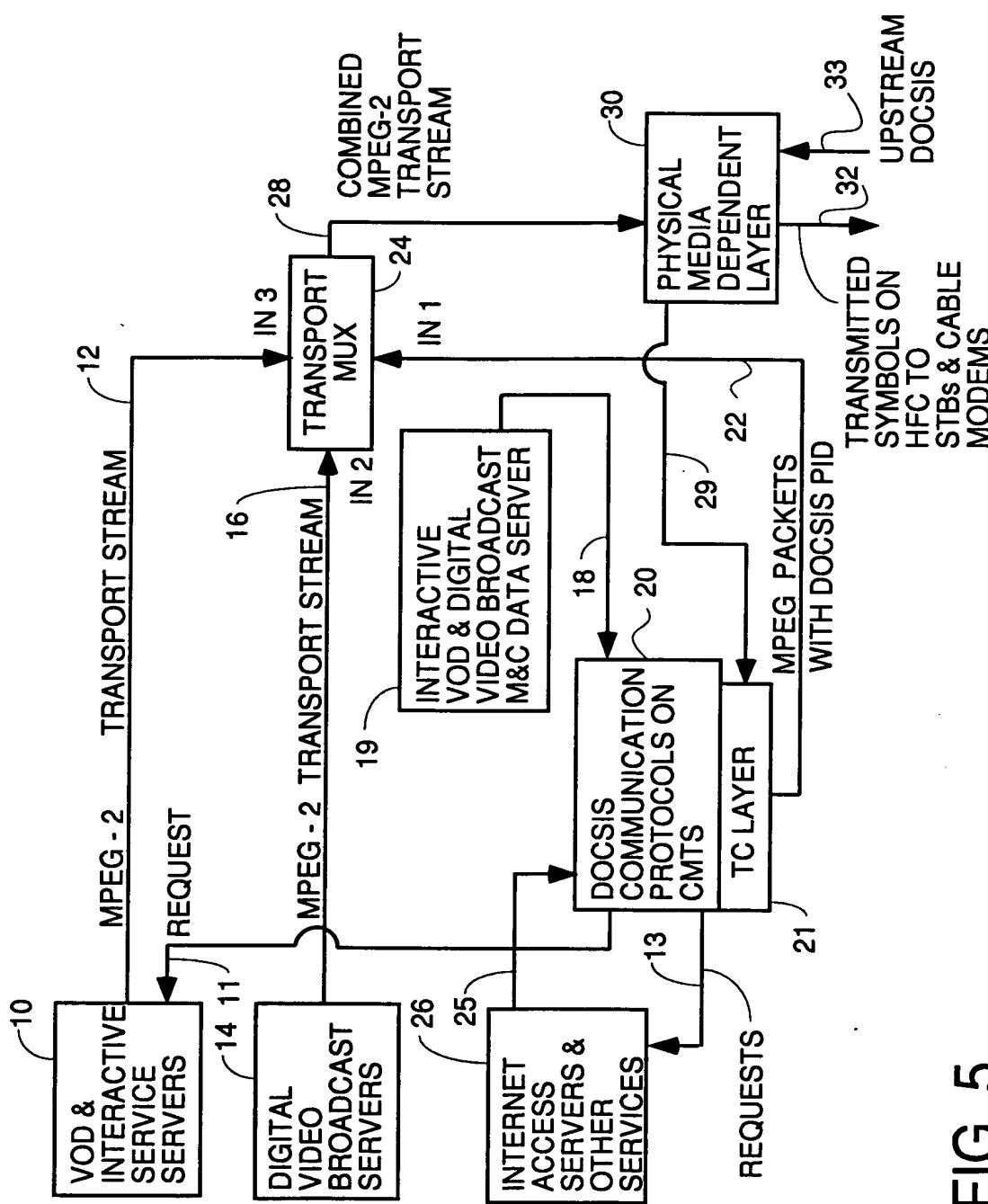


FIG. 5

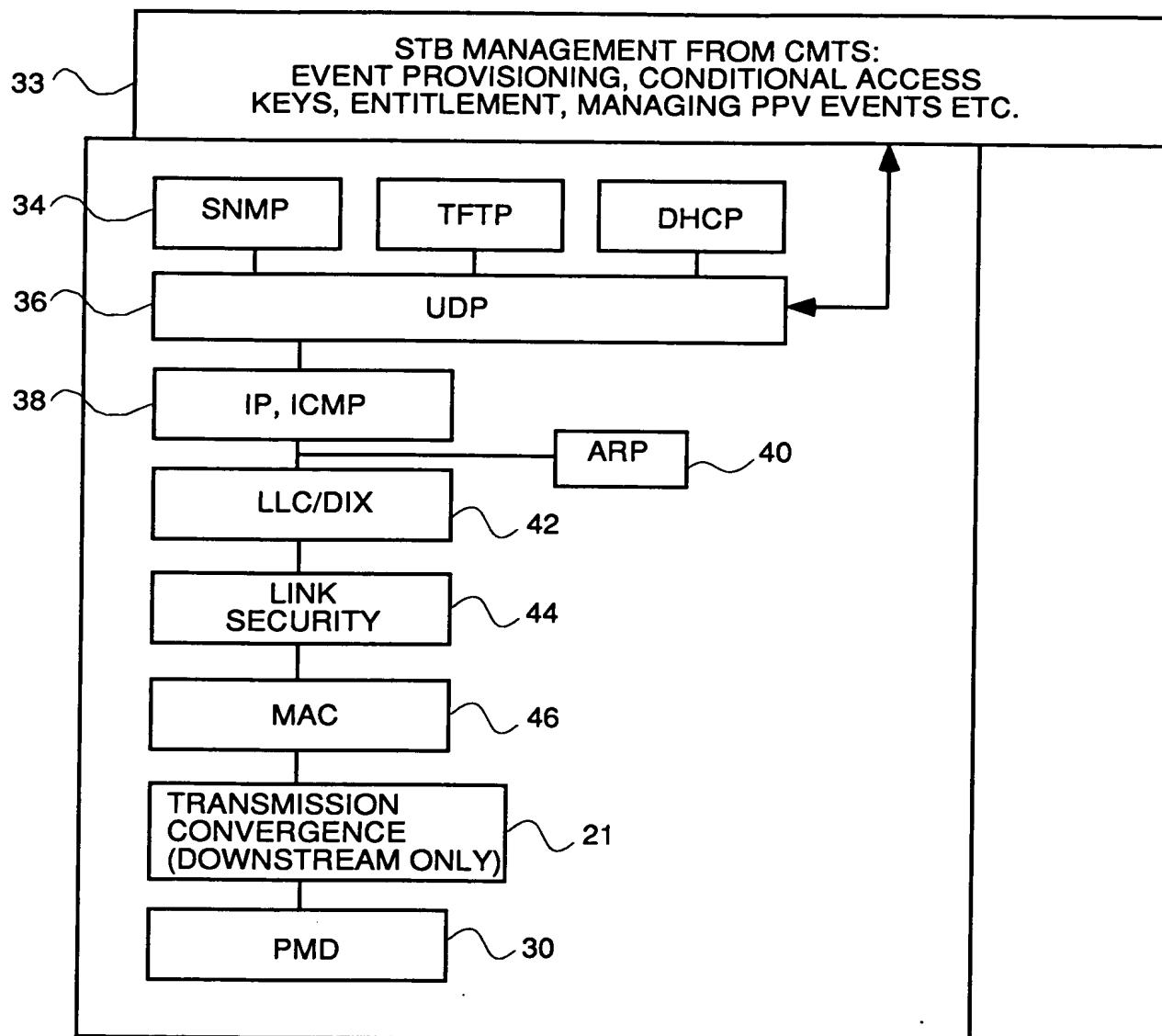


FIG. 6

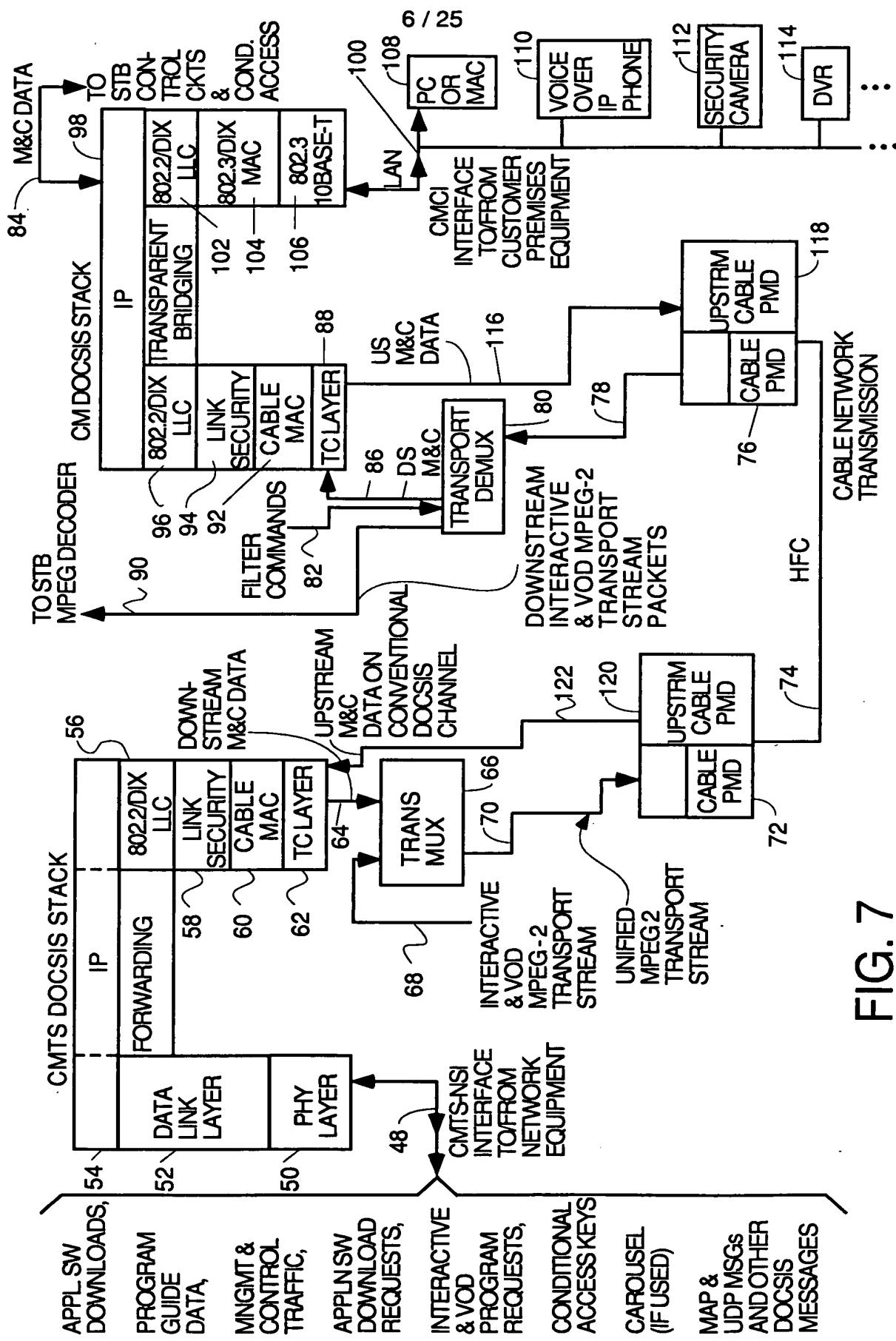
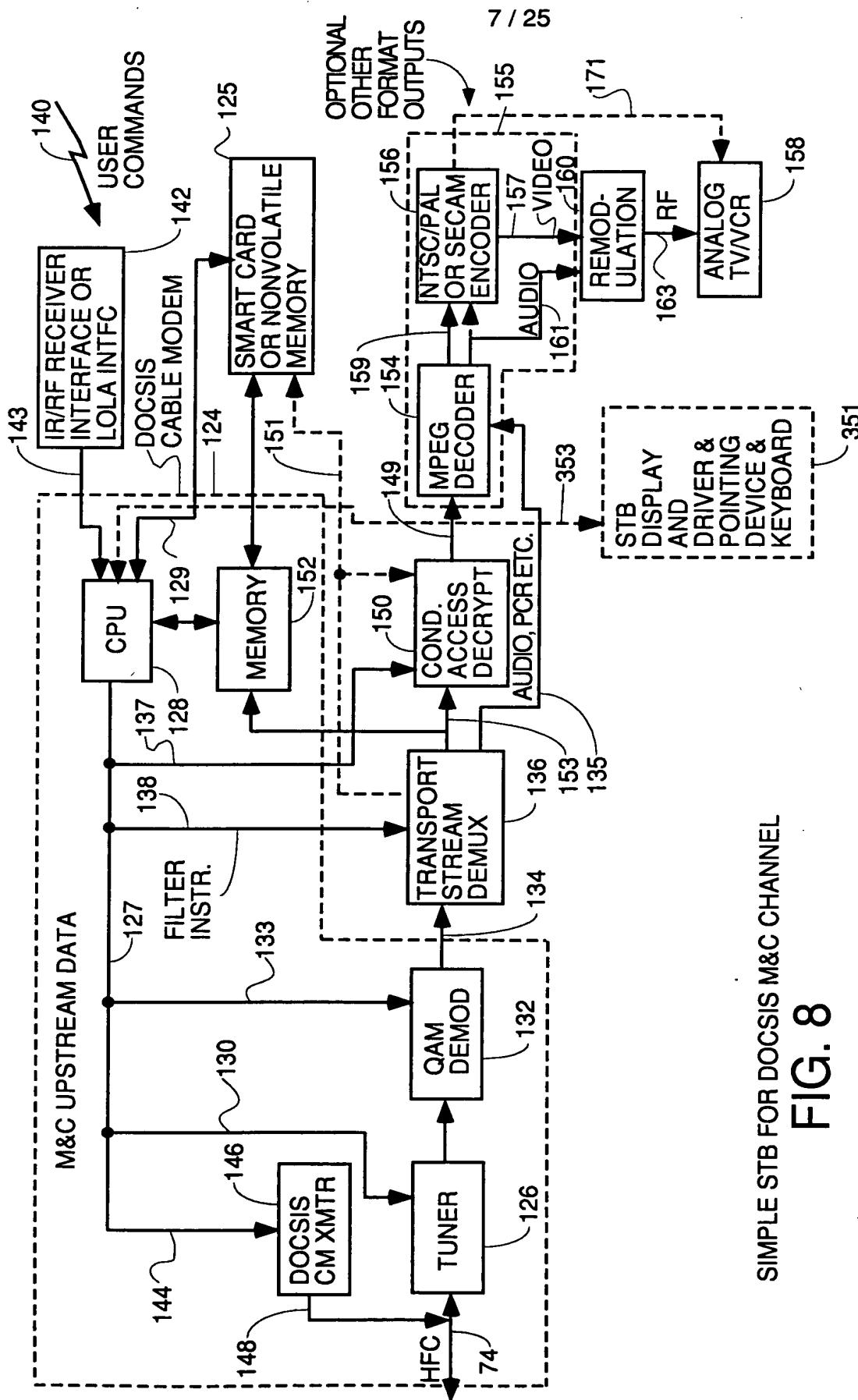
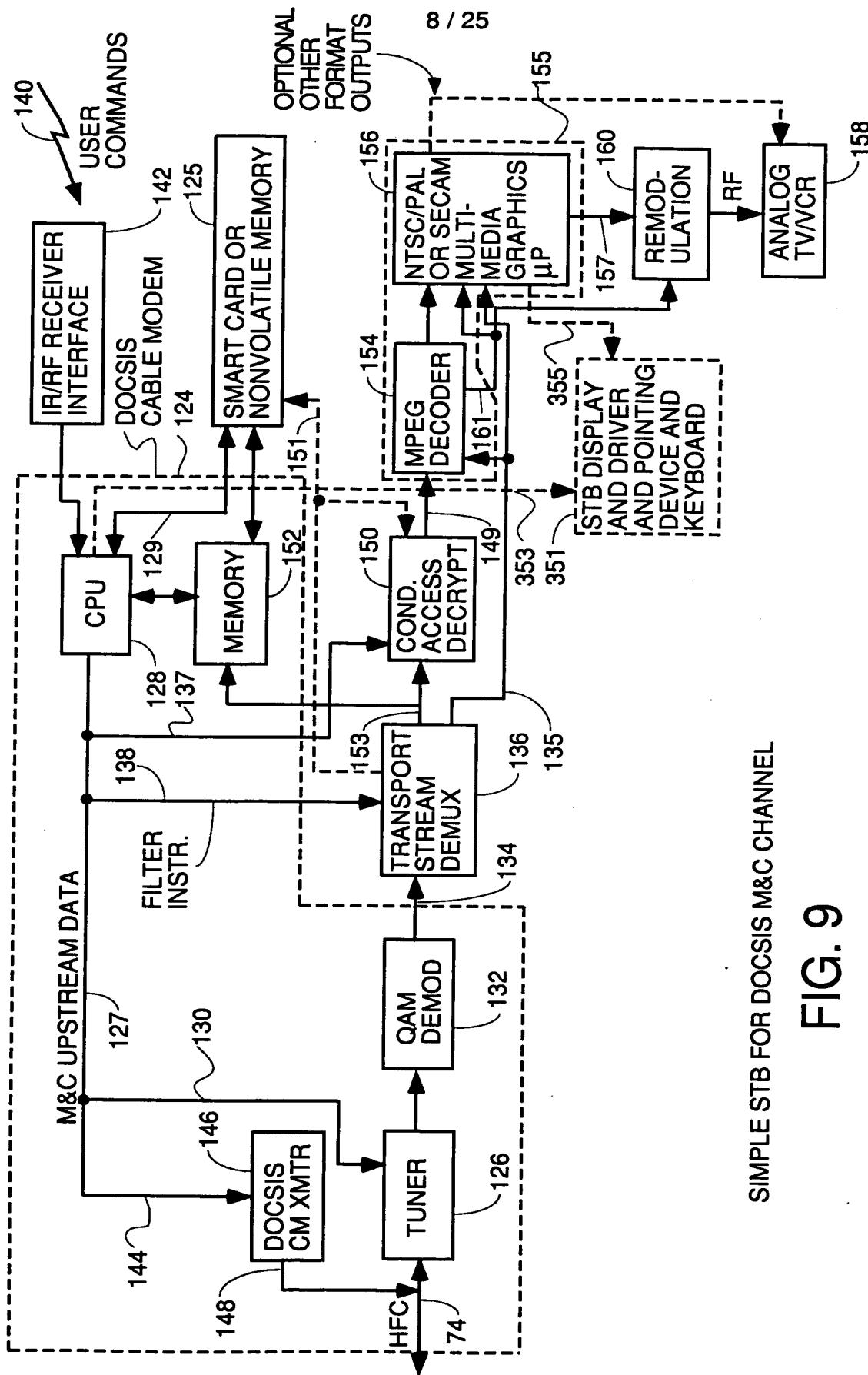


FIG. 7

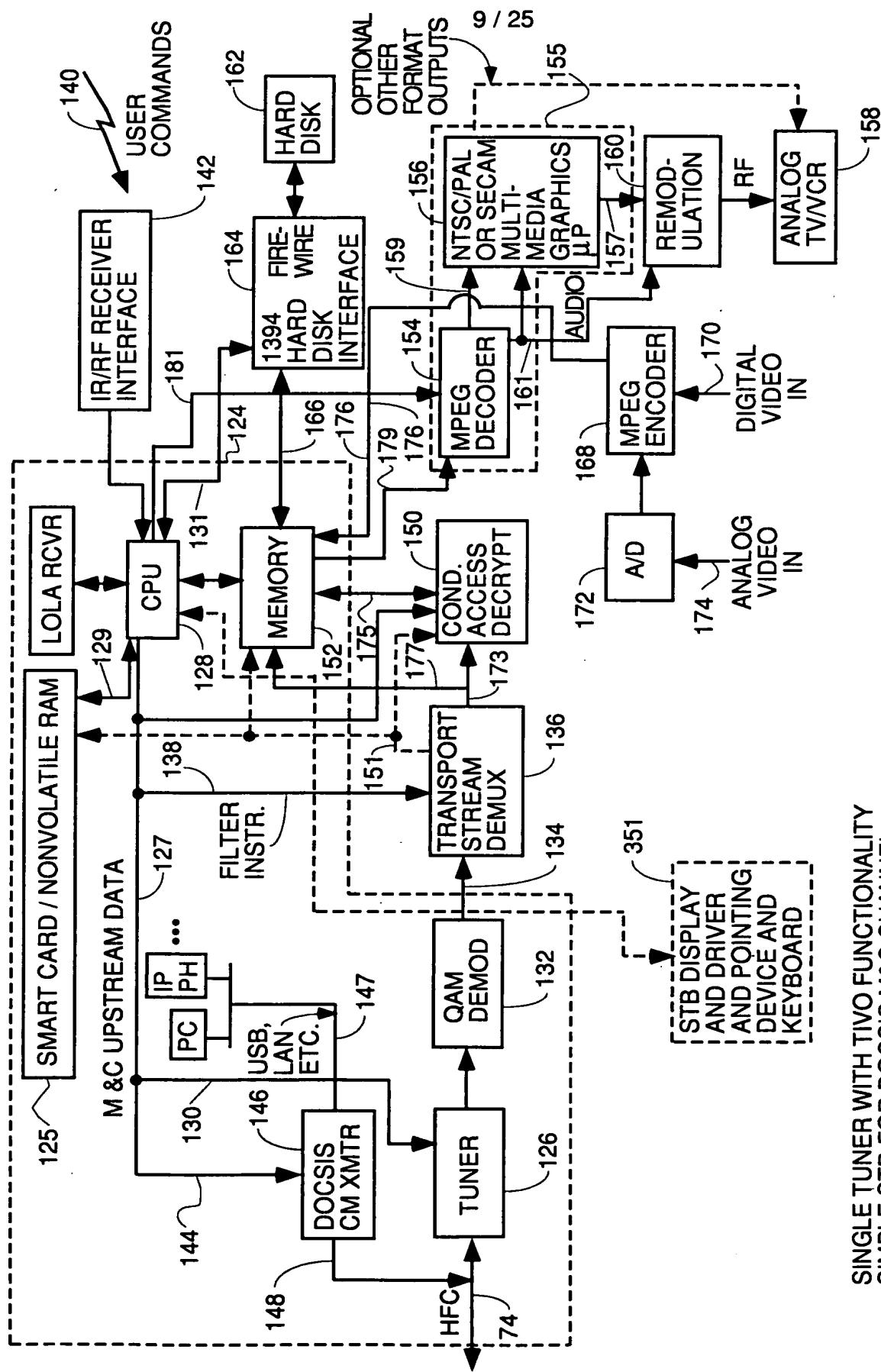


SIMPLE STB FOR DOCSIS M&C CHANNEL



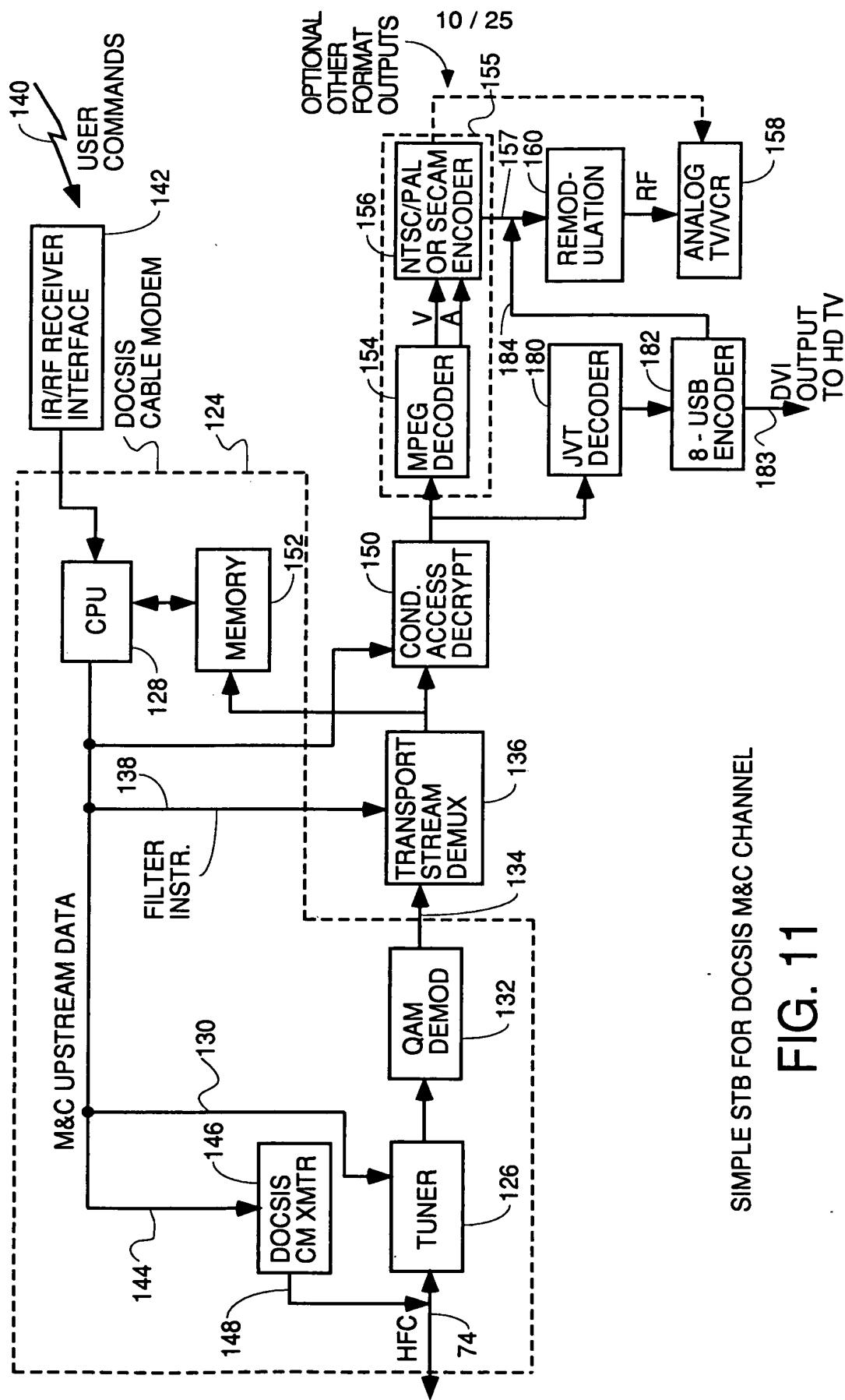
SIMPLE STB FOR DOCSIS M&C CHANNEL

FIG. 9



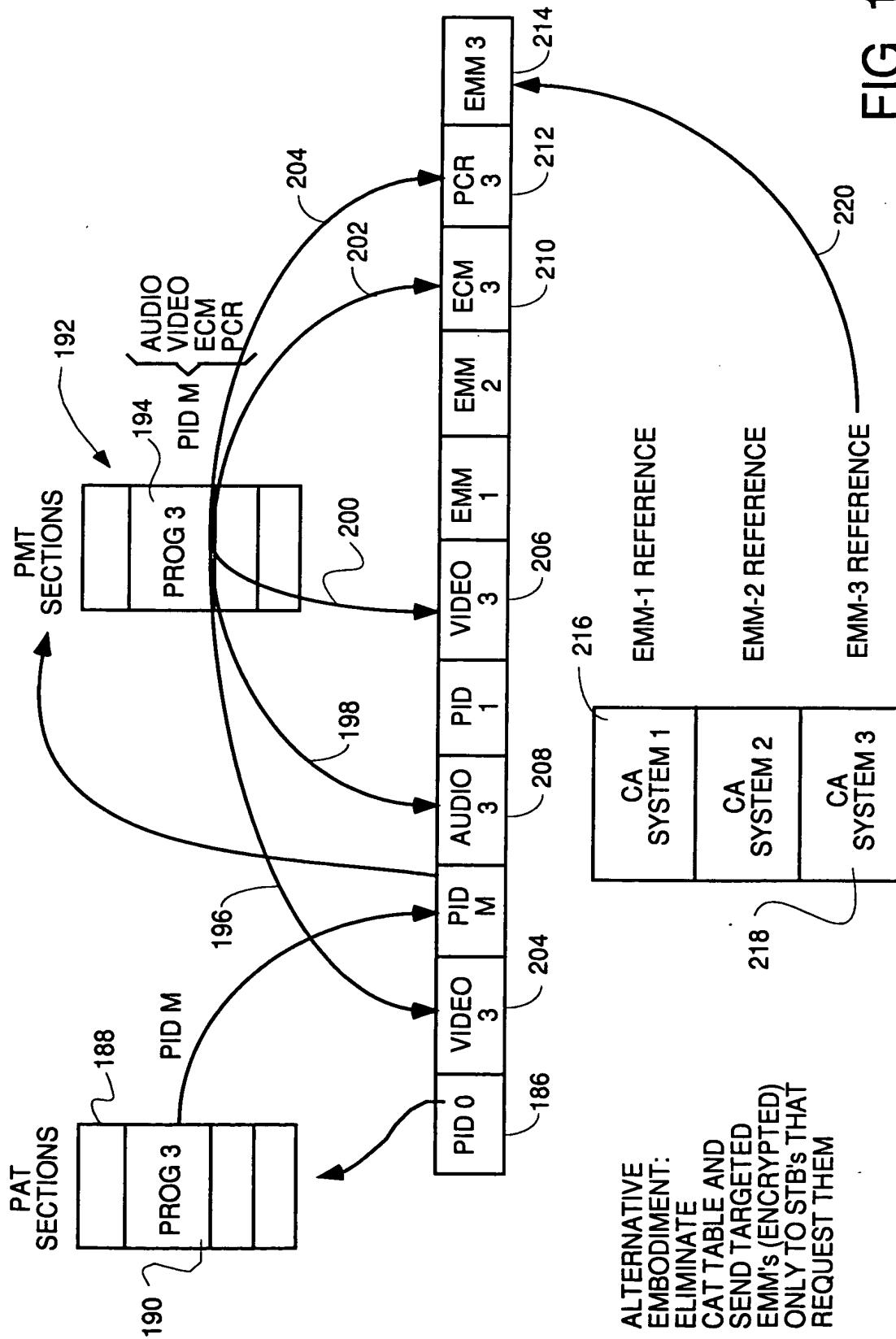
SINGLE TUNER WITH TWO FUNCTIONALITY SIMPLE STB FOR DOCSIS M&C CHANNEL

FIG. 10



SIMPLE STB FOR DOCSIS M&C CHANNEL

FIG. 11



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PROCESS FOR PROVIDING MANAGEMENT AND CONTROL DATA IN-BAND
ON AN MPEG MULTIPLEX ON THE DOCSIS PID

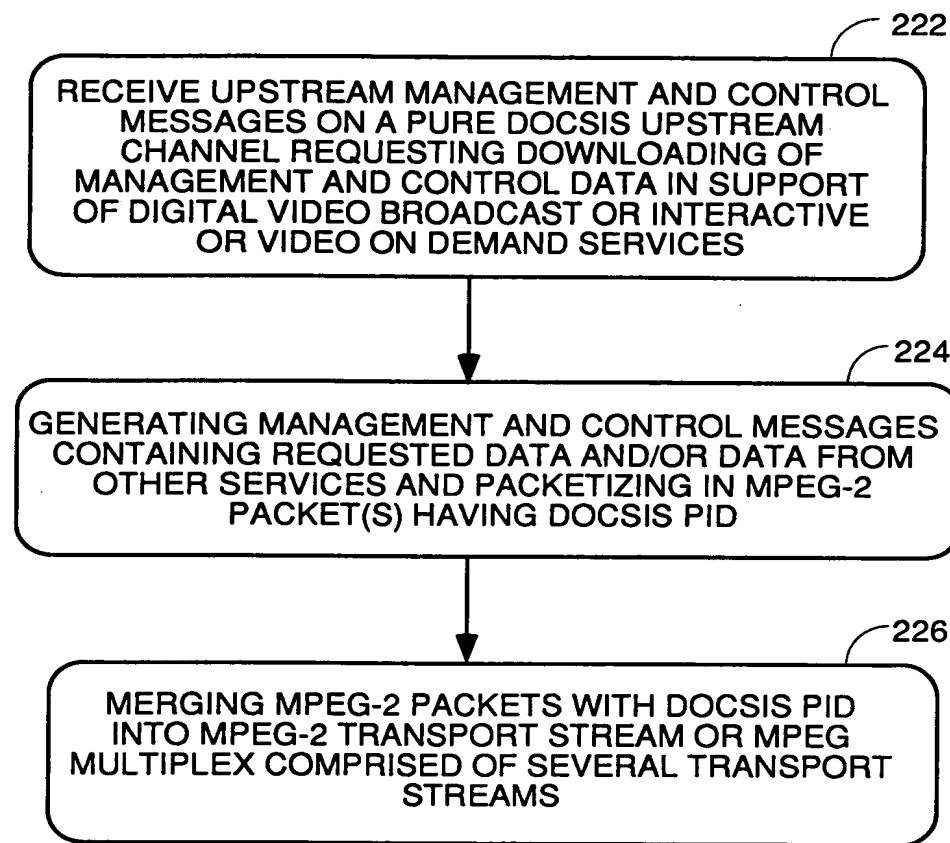


FIG. 13

PROCESS FOR PROVIDING TARGETED CONDITIONAL ACCESS DATA
IN-BAND ON AN MPEG MULTIPLEX WITHOUT USING
A DATA CAROUSEL

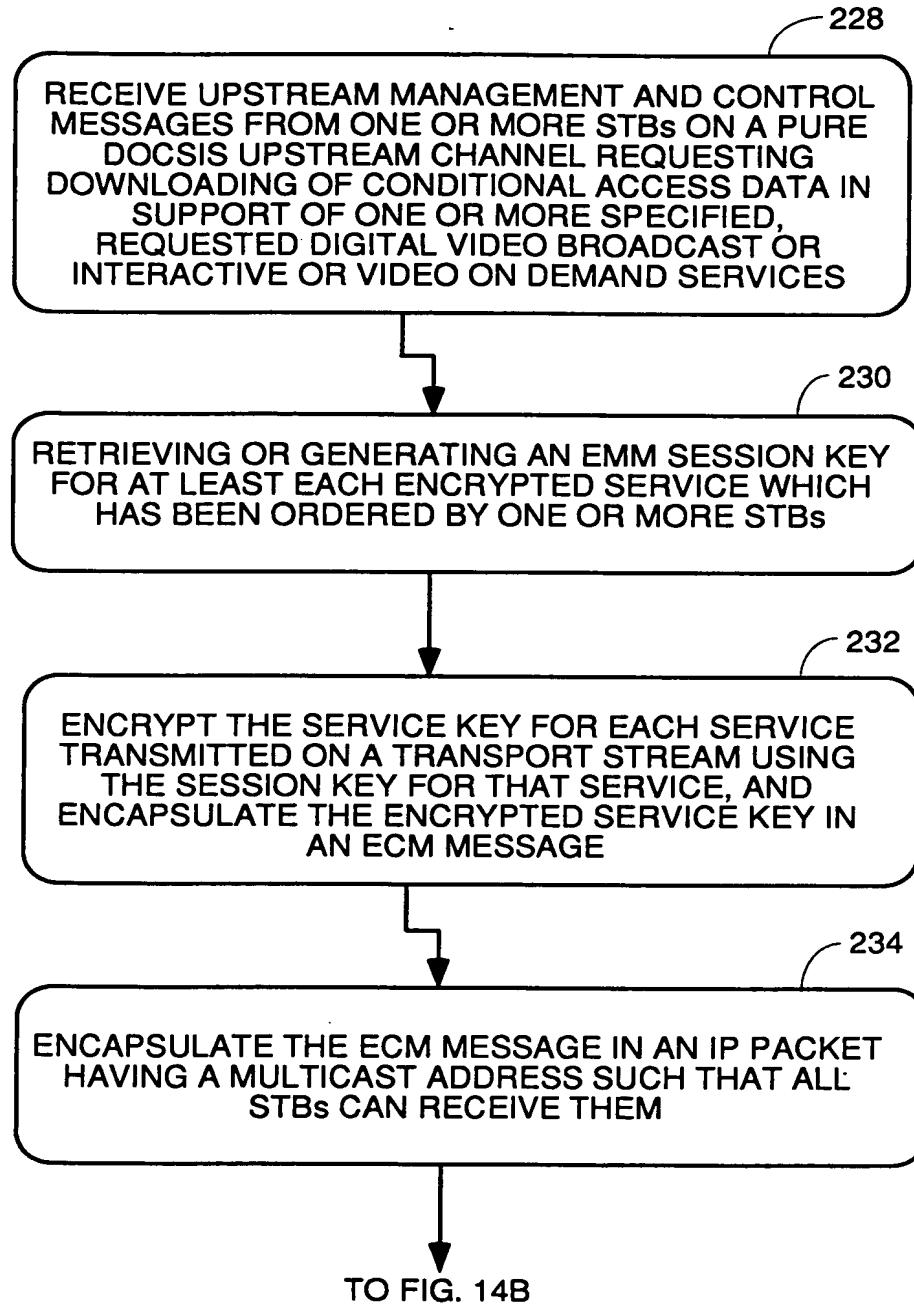


FIG. 14A

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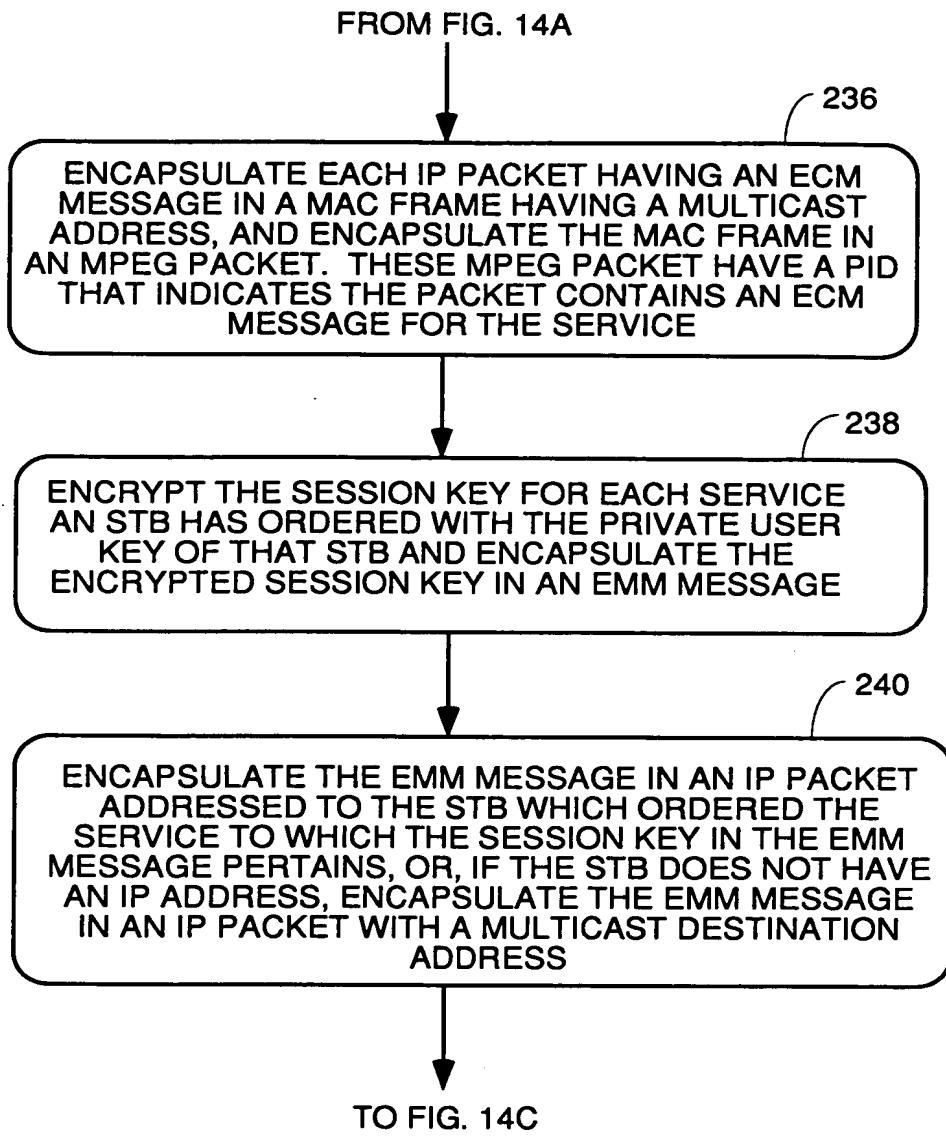


FIG. 14B

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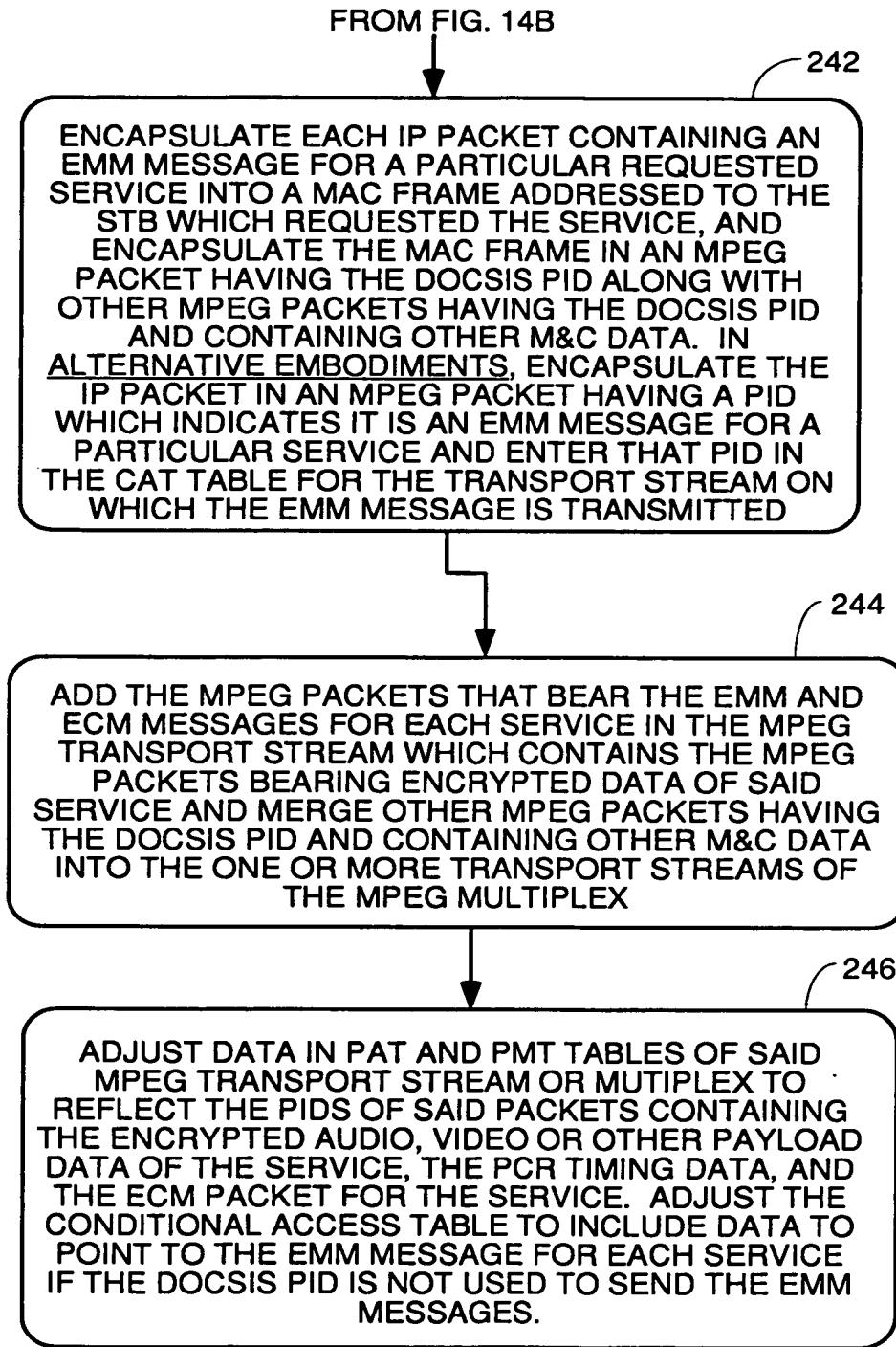


FIG. 14C

PROCESS CARRIED OUT IN STB TO RECOVER EMM AND ECM MESSAGES FROM AN IN-BAND CHANNEL AND DECRYPT PAYLOAD DATA OF REQUESTED SERVICE

248

MICROPROCESSOR RECEIVES COMMANDS TO ORDER AN INTERACTIVE OR OTHER SERVICE OR TUNE A DIGITAL VIDEO BROADCAST, AND GENERATES AND SENDS UPSTREAM DOCSIS M&C MESSAGE REQUESTING APPROPRIATE APPLICATION SOFTWARE, PROGRAM GUIDE DATA, CONDITIONAL ACCESS DATA, ETC. (IF ANY) FOR REQUESTED SERVICE

250

MICROPROCESSOR GENERATES FILTER COMMANDS TO CAUSE PID 0 PACKETS TO BE EXTRACTED FROM DOWNSTREAM MPEG TRANSPORT STREAM MULTIPLEX AND SENT TO IT FOR RE-CONSTRUCTION OF THE PROGRAM ALLOCATION (PAT) TABLE OF THE MPEG MULTIPLEX, AND RE-CONSTRUCTS THE PAT TABLE FROM THE EXTRACTED PACKETS

252

MICROPROCESSOR USES PAT TABLE TO DETERMINE WHICH TRANSPORT STREAMS ARE IN THE MPEG MULTIPLEX AND WHICH TRANSPORT STREAM CONTAINS THE MPEG PACKETS OF THE DESIRED SERVICE, AND DETERMINES THE PID OF THE MPEG PACKETS THAT CONTAIN THE PROGRAM MAP TABLE (PMT) OF THE TRANSPORT STREAM CONTAINING THE REQUESTED SERVICE

254

MICROPROCESSOR GENERATES FILTER COMMANDS TO EXTRACT MPEG PACKETS CONTAINING THE PMT TABLE DATA AND RE-CONSTRUCTS PMT TABLE FROM THOSE PACKETS

256

MICROPROCESSOR SEARCHES PMT TABLE FOR ENTRY FOR REQUESTED SERVICE AND DETERMINES PID NUMBERS FOR THE VIDEO, AUDIO, SUPPLEMENTARY DATA, PCR AND ECM MESSAGES OF THE REQUESTED SERVICE AND GENERATES FILTER COMMANDS TO EXTRACT PACKETS WITH THOSE PIDS.

TO FIG. 15B

FIG. 15A

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FROM FIG. 15A

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PROGRAM DATA RECOVERY AND ROUTING:
EXTRACTED MPEG PACKETS CONTAINING
ENCRYPTED VIDEO, AUDIO, SUPPLEMENTAL DATA, PCR
DATA AND ECM MESSAGE DATA ARE RECOVERED
ECM MESSAGE DATA ARE RECOVERED AND ROUTED TO
APPROPRIATE CIRCUITS IN STB OR CONNECTED TO
STB BY BUS OR LAN FOR FURTHER PROCESSING

260

EMM MESSAGE RECOVERY:
IN EMBODIMENTS WHERE THE EMM MESSAGE IS SENT
ON THE DOCSIS PID, THE MICROPROCESSOR GENERATES
FILTER COMMANDS TO EXTRACT MPEG PACKETS HAVING
DOCSIS PID AND RECOVERS MAC FRAMES OF DOCSIS PID
PACKETS CARRYING THE EMM MESSAGE AND REJECTS ALL
MAC FRAMES NOT ADDRESSED TO THIS STB.

IN EMBODIMENTS WHERE A CAT TABLE IS USED, PID 1
PACKETS ARE EXTRACTED AND THE MAC FRAMES THEREIN
ARE RECOVERED, AND THESE MAC FRAMES ARE ROUTED
TO A CAT TABLE RE-CONSTRUCTION PROCESS. THE
MICROPROCESSOR RECONSTRUCTS THE CAT TABLE, FINDS
EMM PID, GENERATES FILTER COMMANDS FOR THIS PID AND
EXTRACTS THE MPEG PACKETS CONTAINING THE EMM
MESSAGE FOR THE REQUESTED SERVICE FROM MULTIPLEX.
THE MAC FRAMES IN THE EXTRACTED PACKETS CONTAINING
THE EMM MESSAGE FOR THE REQUESTED SERVICE ARE
RECOVERED

262

RECOVER IP PACKETS CONTAINING EMM AND ROUTE:
MICROPROCESSOR RECOVERS IP PACKETS FROM MAC
FRAMES RECOVERED IN STEP 260 BEARING EMM
MESSAGE(S) AND ROUTES IT/THEM TO THE EMM
MESSAGE DECRYPTION PROCESS.

MPEG PACKETS WITH THE DOCSIS PID CARRYING OTHER
M&C DATA ARE RECOVERED, THE MAC FRAMES AND
ENCAPSULATED IP FRAMES ARE RECOVERED AND THE
M&C DATA IS ROUTED TO THE APPROPRIATE CIRCUITRY
IN THE STB OR CONNECTED TO THE STB BY BUS OR LAN
CONNECTION FOR FURTHER PROCESSING

TO FIG. 15C

FIG. 15B

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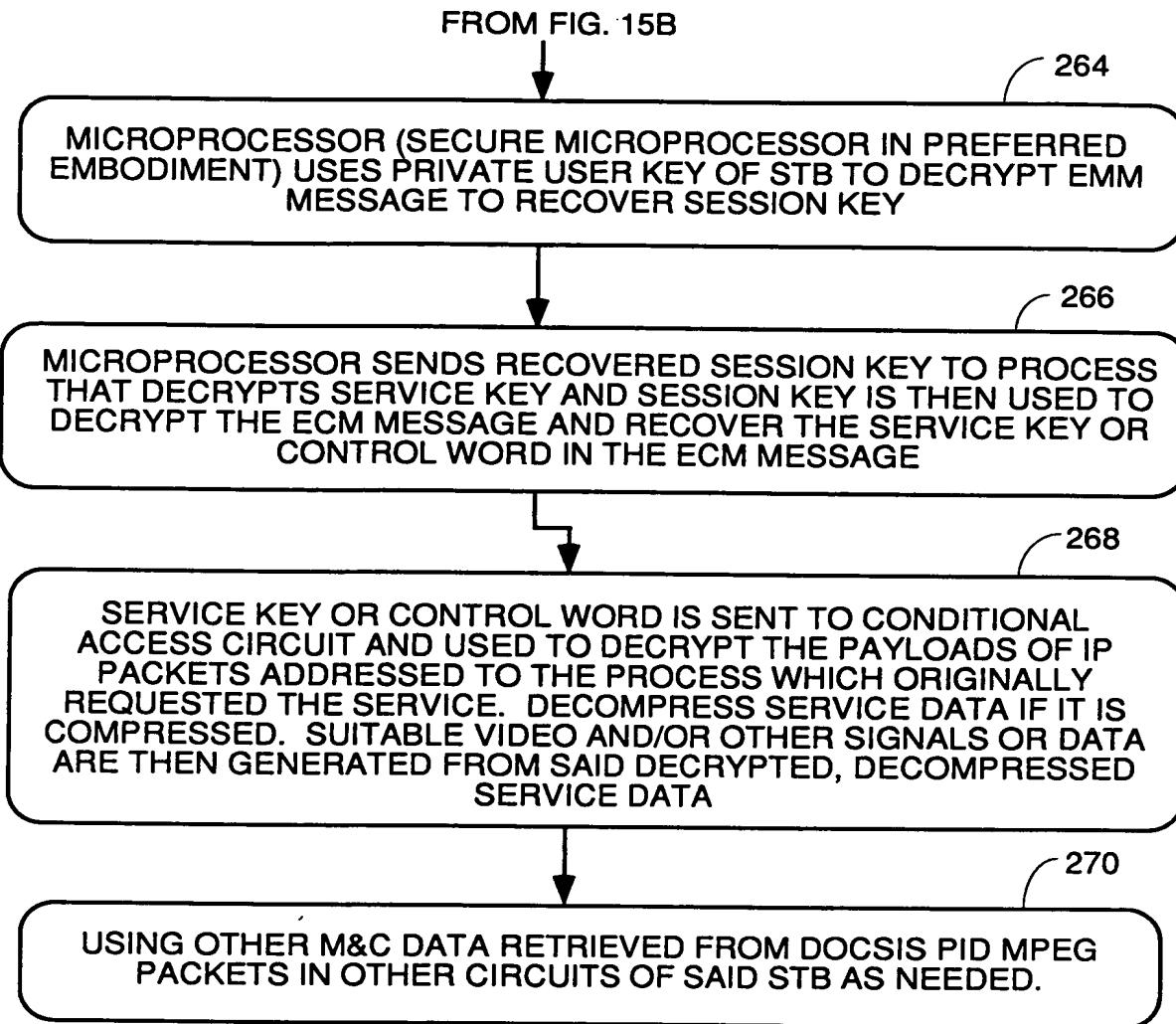


FIG. 15C

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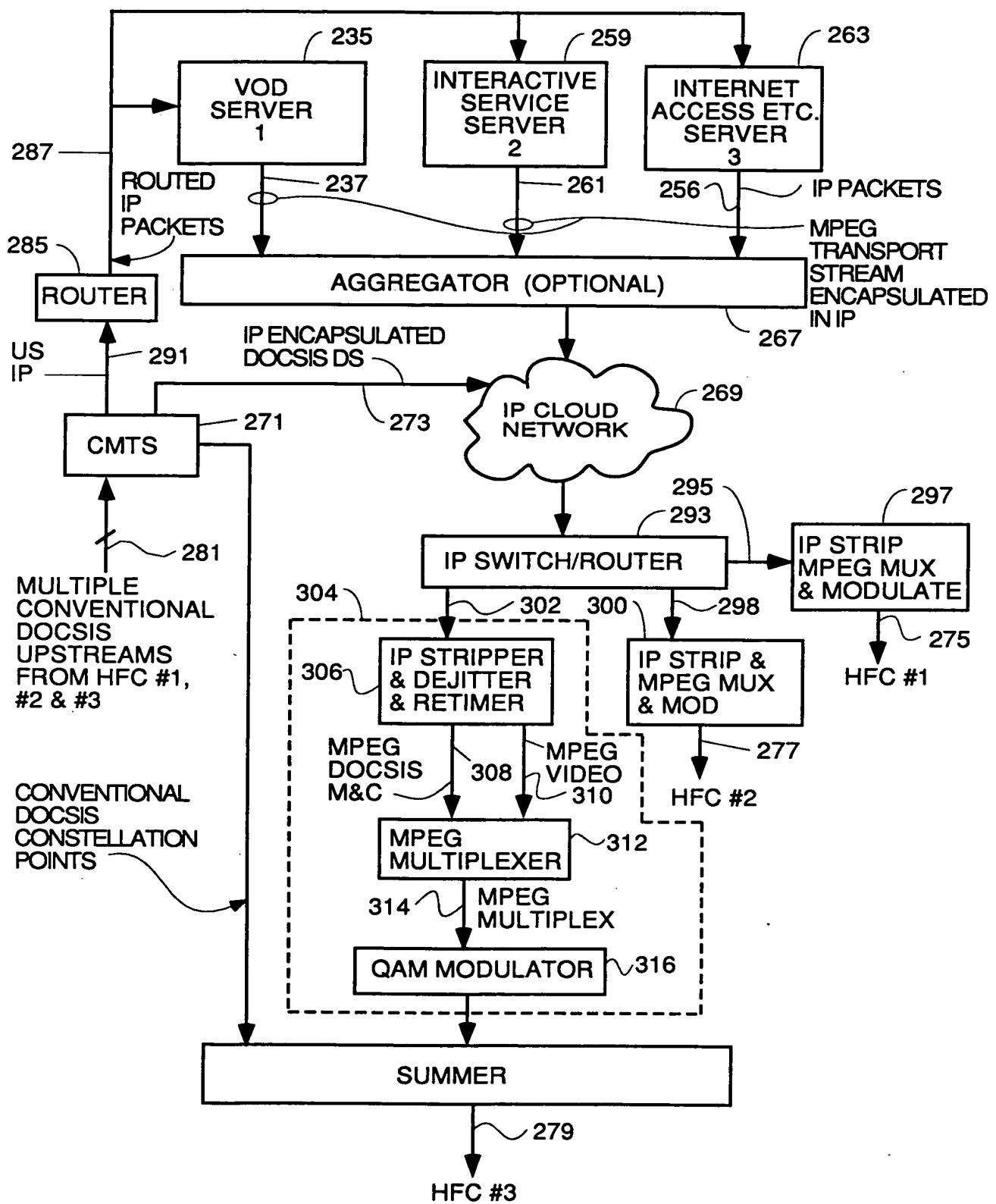


FIG. 16

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PROCESS CARRIED OUT BY SIMPLE, SINGLE TUNER STB TO RECEIVE ENCRYPTED DIGITAL VIDEO BROADCASTS

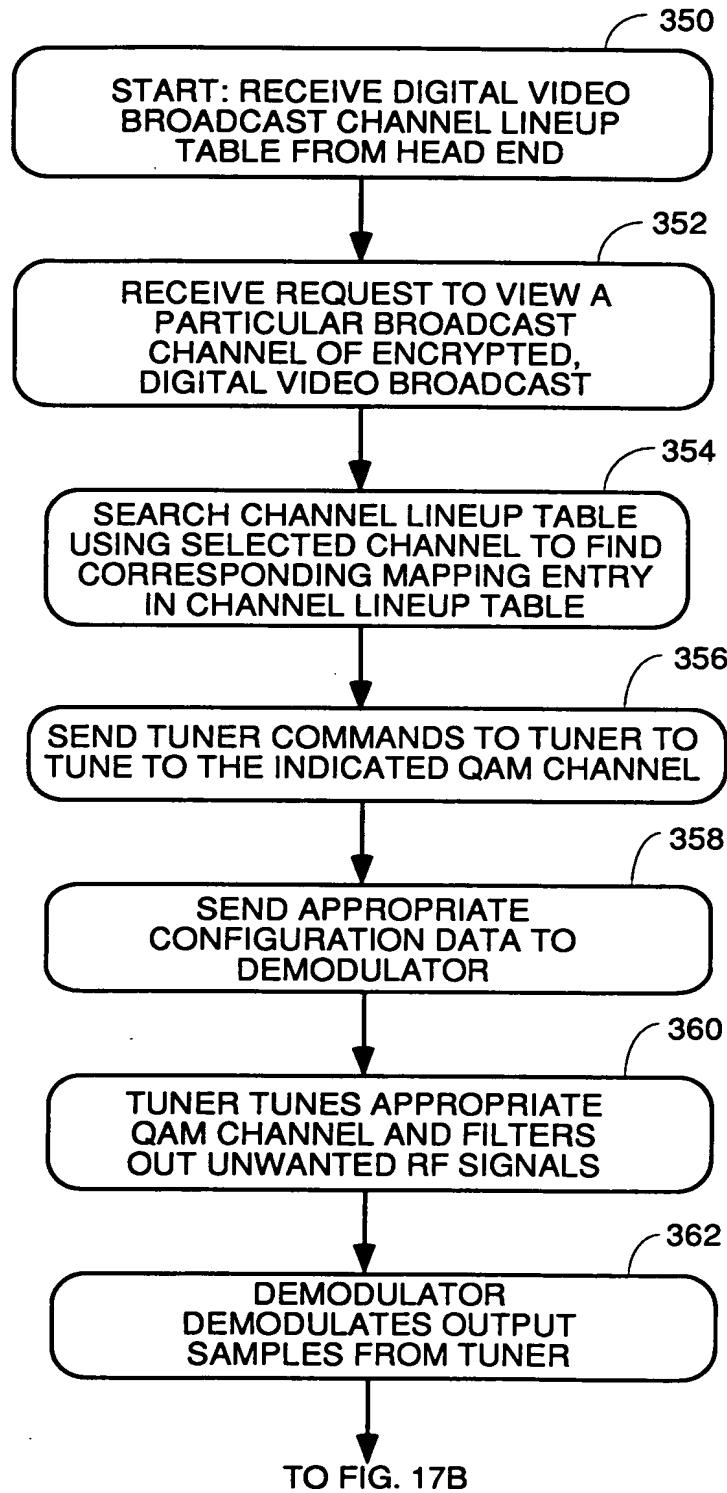


FIG. 17A

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FROM FIG. 17A

364

CONTROL MEANS PROGRAMS TRANSPORT STREAM DEMULTIPLEXER TO EXTRACT ALL MPEG PACKETS WITH SELECTED PIDS FOR REQUESTED BROADCAST CHANNEL, ITS ECM MESSAGE, DOCSIS PIDS AND ANY EMM MESSAGE

366

TRANSPORT STREAM DEMULTIPLEXER EXTRACTS MPEG PACKETS WITH SELECTED PIDS AND ROUTES THEM TO APPROPRIATE CIRCUITS IN STB

368

EMM MESSAGE WITH ENCRYPTED SESSION KEY OF REQUESTED CHANNEL IS DECRYPTED AND STORED

370

MPEG PACKETS HAVING ECM MESSAGE PID ROUTED TO CONDITIONAL ACCESS CIRCUIT HAVE WORKING KEYS EXTRACTED THEREFROM AND DECRYPTED USING SESSION KEY

372

MPEG PACKETS HAVING PID OF VIDEO OF REQUESTED PROGRAM WHICH HAVE BEEN ROUTED TO CONDITIONAL ACCESS CIRCUIT HAVE THEIR VIDEO DECRYPTED USING WORKING KEY

374

MPEG PACKETS HAVING PIDS OF AUDIO, SUPPLEMENTARY DATA, PCR TIMING ETC. ARE PROCESSED BY APPROPRIATE CIRCUITRY

376

DECRYPTED MPEG VIDEO PACKETS ARE DECOMPRESSED IN MPEG DECODER AND COORDINATED WITH AUDIO DATA, AND A YUV OR RGB SIGNAL AND AUDIO SIGNAL IS OUTPUT

378

NTSC (OR PAL OR SECAM) ENCODER CONVERTS INPUT AUDIO AND VIDEO SIGNALS TO NTSC (OR PAL OR SECAM) OUTPUT SIGNAL

380

REMODULATION UNIT RECEIVES NTSC SIGNAL AND REMODULATES ONTO RF CARRIER OF APPROPRIATE FREQUENCY

FIG. 17B

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PROCESS CARRIED OUT BY SIMPLE, SINGLE TUNER STB TO RECEIVE ENCRYPTED DIGITAL VIDEO-ON-DEMAND PROGRAMS

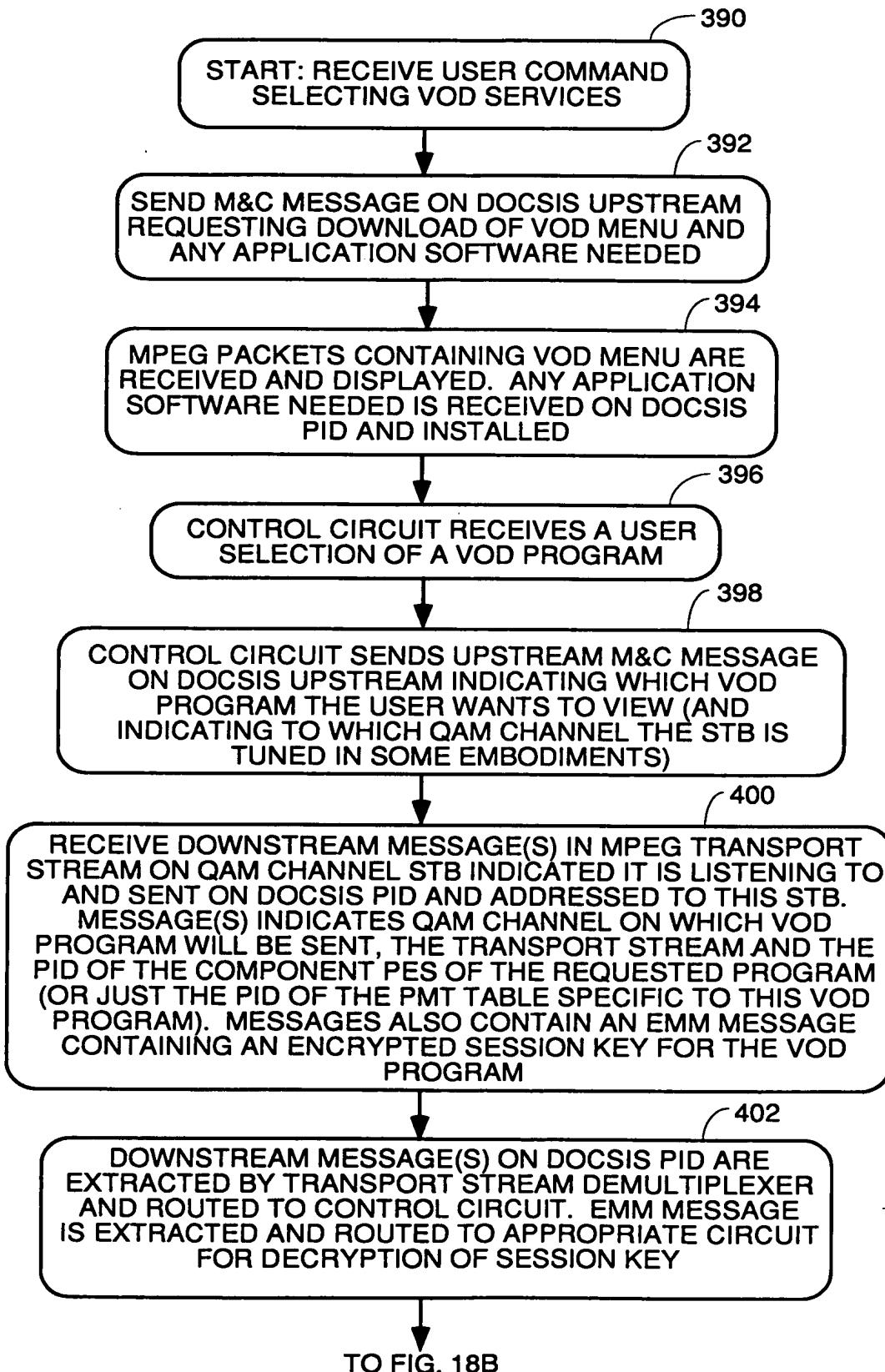


FIG. 18A

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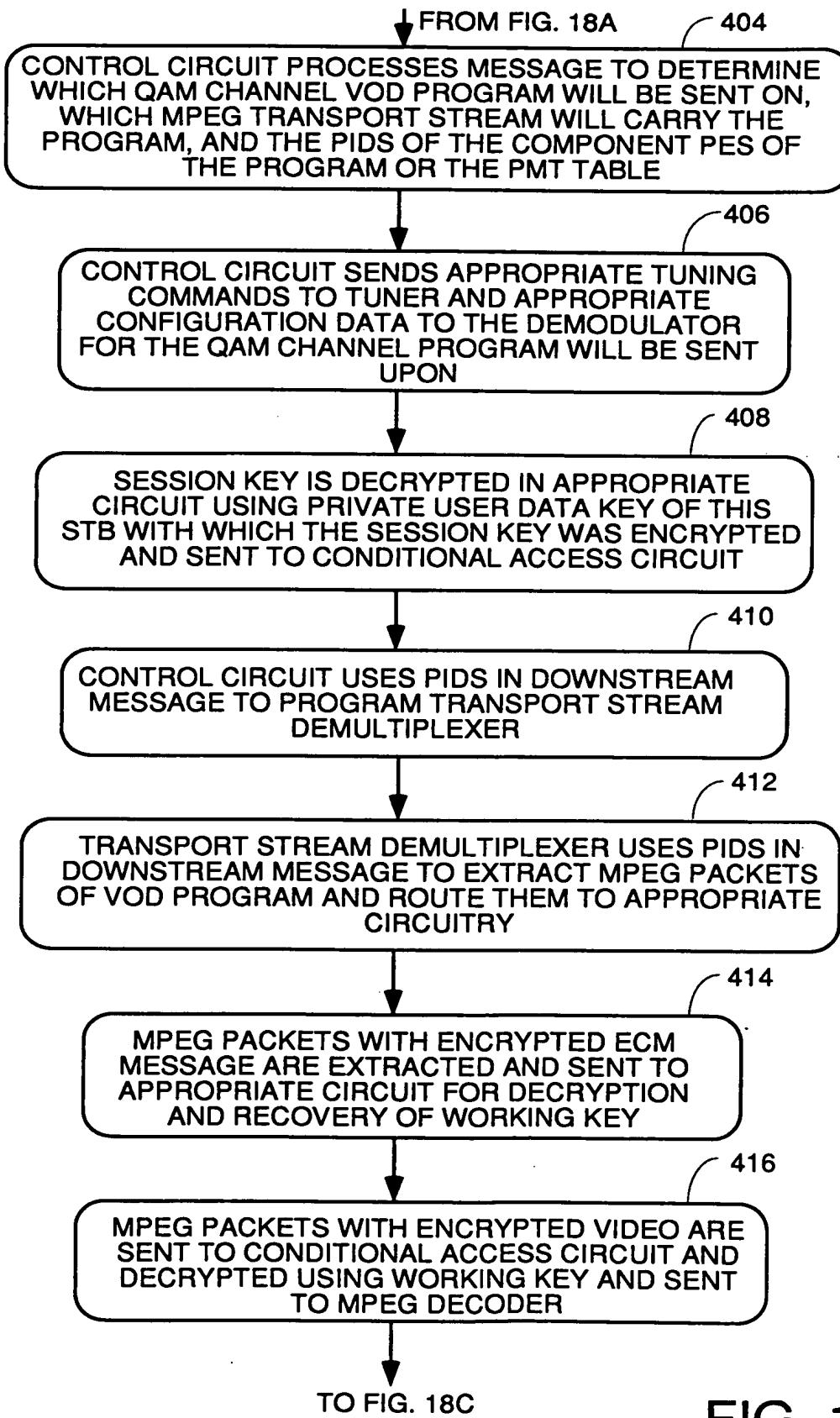


FIG. 18B

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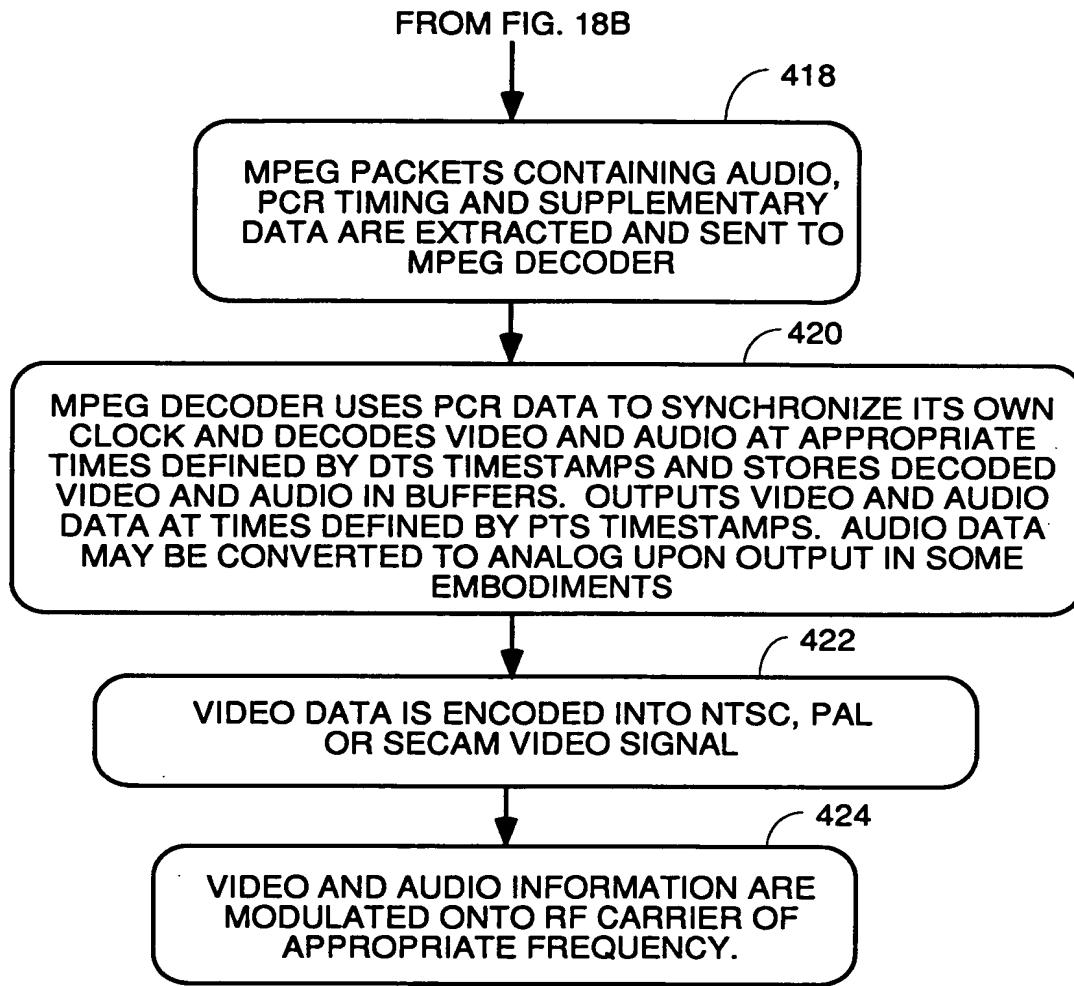


FIG. 18C

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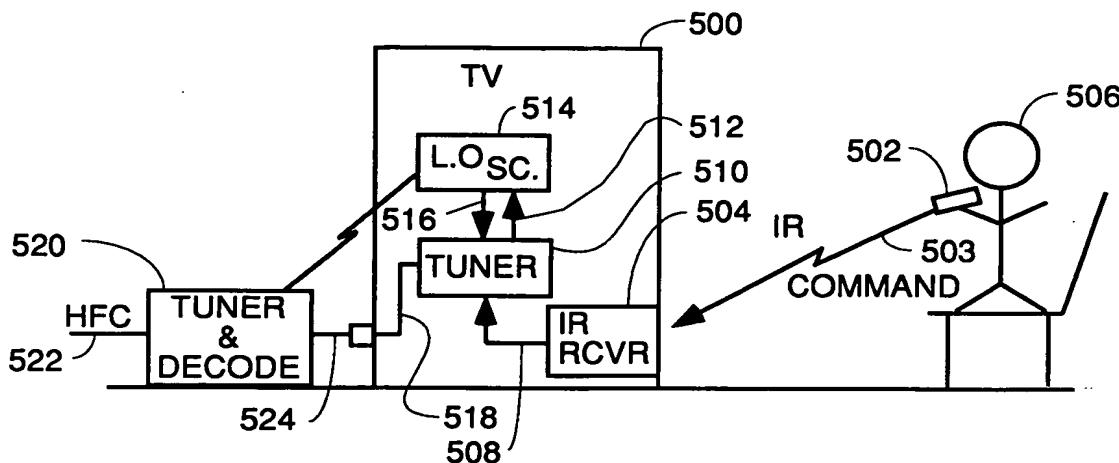


FIG. 19

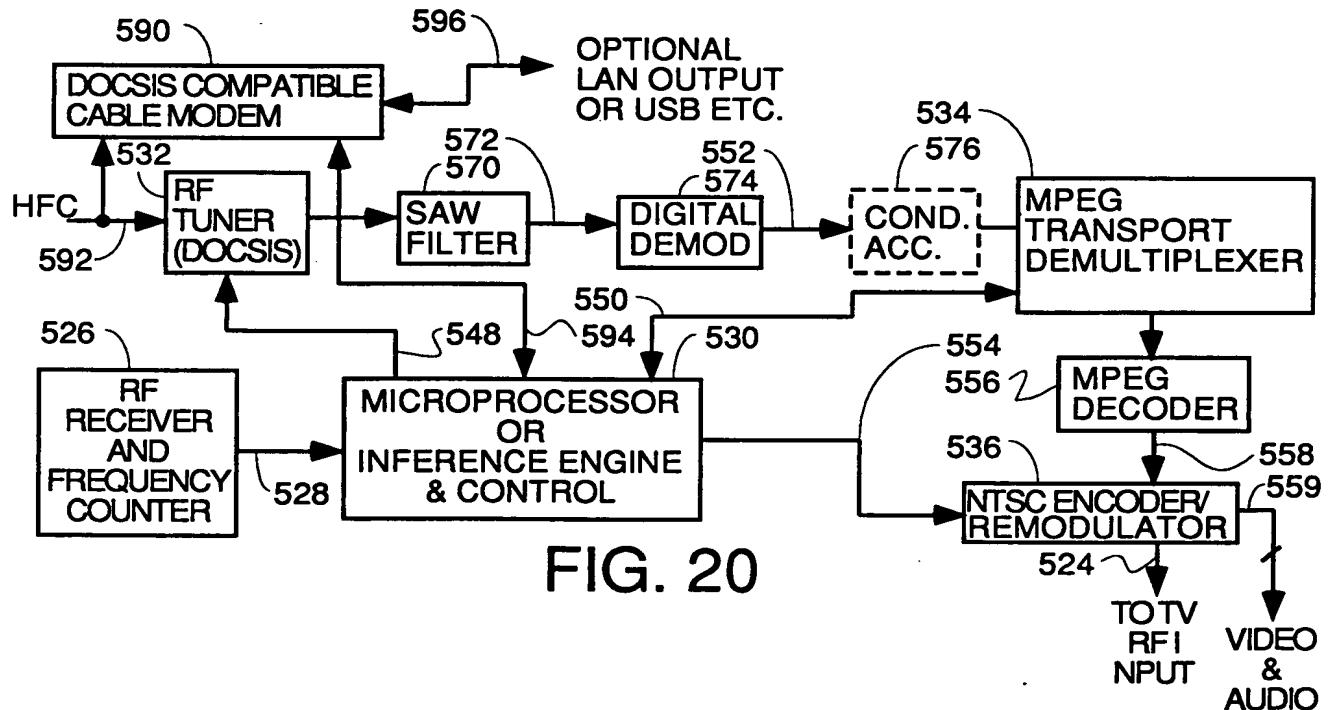


FIG. 20

538	540	542	544	546
LO. FREQ.	ANALOG TV CHANNEL #	CORRESPONDING DIGITAL TV CHANNEL # & FREQ.	CORRESPONDING PID	OUTPUT FREQ.
XX	AA	BB	CC	DD
YY	EE	FF	HH	II
⋮	⋮	⋮	⋮	⋮
	562	566	568	564

FIG. 21